## Claims

[c1] A process of forming a diffusion aluminide coating on a component having a ceramic coating on a first surface thereof, the process comprising the steps of: applying an activator-free slurry on a second surface of the component that is not covered by the ceramic coating, the slurry containing aluminum particles; and then

in an inert or reducing atmosphere, heating the component to melt the aluminum particles and diffuse aluminum into the second surface of the component and thereby form a diffusion aluminide coating on the second surface, the ceramic coating being substantially undamaged by the slurry during the heating step.

[c2] A process according to claim 1, wherein the second surface is an internal surface defined by a hole in the component, and the first surface is an external surface intersected by the hole.

[c3] A process according to claim 2, further comprising the steps of depositing the ceramic coating on the first surface of the component, and then machining the hole in the component prior to applying the slurry.

[c4] A process according to claim 1, wherein the applying step comprises depositing a substantially uniform layer of the slurry on the second surface.

[c5] A process according to claim 1, wherein the applying step comprises applying a substantially uniform layer of the slurry on the second surface and on the ceramic coating.

[c6] A process according to claim 1, wherein the component is heated to about 960 ° C to about 1090 ° C.

[c7] A process according to claim 1, wherein the component is formed of a superalloy.

[c8] A process according to claim 1, wherein the component is an air-cooled gas turbine engine component.

[c9] A process according to claim 1, wherein the process repairs a portion of a diffusion aluminide bond coat on the second surface and exposed by a spalled region of the ceramic coating.

[c10] A process for forming a diffusion aluminide coating on an air-cooled superalloy component of a gas turbine engine, the process comprising the steps of:
depositing a ceramic coating on an external surface of the component;
machining holes in the component to define internal surfaces within the component, the holes intersecting the external surface of the component and at least one internal passage within the component;
applying an activator-free slurry to the internal surfaces of the component, the slurry containing aluminum particles; and then
in an inert or reducing atmosphere, heating the component to a temperature of about 960 ° C to about 1090 ° C that is held for a duration sufficient to melt the aluminum particles, diffuse aluminum into the internal surfaces, and form a diffusion aluminide coating on the internal surfaces, the ceramic coating being substantially undamaged by the slurry during the heating step.

[c11] A process according to claim 11, wherein the applying step comprises flowing the slurry through the internal passage and the holes to deposit a substantially uniform layer of the slurry on the internal surfaces.

[c12] A process according to claim 11, wherein the applying step comprises applying a substantially uniform coating of the slurry on the internal surfaces and on the ceramic coating.